

Intensification of a Vortex During Free Draining • K. Ramamurthi and T. John Tharakan .....	292
Analyse par traitement d'images du dépôt de particules projetées par un jet gazeux sur une surface plane • J. Lédé, C. Cifuentes, M. N. Pons, J. Villermaux et S. Marcant .....	300
Aerodynamics and Heat Transfer During Coating of Tablets in Two-Dimensional Spouted Bed • S. C. S. Rocha, O. P. Taranto and G. E. Ayub .....	308
Liquid-Solid Mass Transfer in a Slurry Bubble Column and a Gas-Liquid-Solid Three-Phase Fluidized Bed • Ken-Ichi Kikuchi, Hiroshi Takahashi and Takuo Sugawara .....	313
Improving Membrane Performance for Nitrogen Production from Air • D. A. Spagnolo, K. T. Chuang and C. Y. Pan .....	322
The Catalytic Oxidative Coupling of Methane: I. Comparison of Experimental Performance Data from Various Types of Reactor • K. T. Do, J. H. Edwards and R. J. Tyler .....	327
Methane-Propylene Homologation and Reactivity of Surface Carbon on Modified Ni-Al <sub>2</sub> O <sub>3</sub> Catalysts • Qingdong Liu and Kevin J. Smith .....	337
The Selective Non-Catalytic Reduction of Nitric Oxide Using Ammonia at up to 15% Oxygen • J. A. Caton, J. K. Namey, II, C. Cariappa and W. R. Laster .....	345
A Study of Supported Molybdenum Catalysts for the Reduction of SO <sub>2</sub> with CH <sub>4</sub> : Effect of Sulphidation Method • David J. Mulligan, Kawai Tam and Dimitrios Berk .....	351
Ultrapolyolysis of Automobile Shredder Residue • Z. Shen, M. Day, J. D. Cooney, G. Lu, C. L. Briens and M. A. Bergougnou .....	357
Equation of State Representation of Aqueous Mixtures Using an Association Model • Ali A. Shinta and Abbas Firoozabadi .....	367
Time Optimal Control of High Dimensional Systems by Iterative Dynamic Programming • Bojan Bojkov and Rein Luus .....	380
Factors Affecting the Optimal Performance of a High-Yield Pulping Operation • G. Broderick, J. Paris and J. L. Valade .....	391

## Notes

Heat Transfer Characteristics of Coal-Water Mixtures • Takashi Saeki and Hiromoto Usui .....	400
Diffusion Coefficient of Hydrogen in a Pd-Ag Membrane: Effect of Hydrogen Solubility • N. Jemaa, B. P. A. Grandjean and S. Kalaguine .....	405
Pyrolysis of Kraft Lignin in Molten ZnCl <sub>2</sub> -KCl Media with Tetralin Vapor Addition • M. Kudsy, H. Kumazawa and E. Sada .....	411
Call for Papers: Chemical Engineering Research in Pulp and Paper ....	416
Contents Page from Chemical Engineering Research and Design .....	404

## August 1995

## Articles

Power Dissipation and Flow Patterns in Reciprocating Baffle-plate Columns • M. H. I. Baird and N. V. Rama Rao .....	417
Gas Phase Flow in Bubble Columns: A Convective Phenomenon • Caroline L. Hyndman and Christophe Guy .....	426

Distribution des temps de séjour en écoulement tourbillonnaire annulaire induit par une entrée tangentielle du liquide • P. Legentilhomme et J. Legrand .....	435
Prediction of Heat Transfer to Liquid-Solid Fluidized Beds • M. Jamialahmadi, M. R. Malayeri and H. Müller-Steinhagen .....	444
Process Design of Condensers for Vapor Mixtures in the Presence of Non-Condensable Gases • Barbara Mazzarotta and Enzo Sebastiani .....	456
A Combined Model of Mass Transfer Coefficients For Contaminated Drop Liquid-Liquid Systems • M. J. Slater .....	462
Isoelectric Precipitation of Sunflower Protein in a Tubular Precipitator • M. Raphael, S. Rohani and F. Sosulski .....	470
Catalytic Conversion of Canola Oil to Fuels and Chemicals Over Various Cracking Catalysts • Sai P. R. Katikaneni, John D. Adjaye and Narendra N. Bakhshi .....	484
Détermination de constantes cinétiques du craquage catalytique par la modélisation du test de microactivité (MAT) • Isabelle Pitault, Michel Forissier et Jean-René Bernard .....	498
On the Timing of Primary Fragmentation During Bituminous Coal Particle Devolatilisation in a Fluidized Bed Combustor • John F. Stubington and Brendan Moss .....	505
Factors Affecting Catalytic Performance in YADH-catalyzed Reductions in Non-conventional Media • P. Nikolova, H. Goldman and O. P. Ward .....	510
Desorption of Cadmium from Algal Biosorbent • Ilana Aldor, Eric Fourest and Bohumil Volesky .....	516
Mathematical Modeling and Steady-State Analysis of a Scheibel Extraction Column • I. Alatiqi, G. Aly, F. Mjalli and C. J. Mumford .....	523
Mathematical Modeling of the Rotary Coke Calcining Kiln • R. T. Bui, G. Simard, A. Charette, Y. Kocaeffe and J. Perron .....	534
Evaluation of Capital Cost Data: Part 9: Liquid Waste Disposal With Emphasis on Chemical Treatment • David G. Wright and Donald R. Woods .....	546

## Notes

Determination of Minimum Fluidization Velocity by Pressure Fluctuation Measurement • Derek Wilkinson .....	562
Drag on Chains and Agglomerates of Spheres in Viscous Newtonian and Power Law Fluids • R. P. Chhabra, Tushar Singh and S. Nandrajog .....	566
Revisiting the Maximum Conversion of Substrate in an Enzymatic CSTR with Micromixing Considerations • F. Xavier Malcata .....	572
Call for Papers: Chemical Engineering Research in Pulp and Paper ....	576
Erratum .....	575
Contents Pages from Chemical Engineering Research and Design .....	571

## October 1995

## Circulating Fluidized Beds

Introduction and Overview • John R. Grace and Franco Berruti .....	577
Hydrodynamics of Circulating Fluidized Bed Risers: A Review • F. Berruti, J. Chaouki, L. Godfroy, R. S. Pugsley and G. S. Patience .....	579
Simulation of FCC Particles Flow Behavior in a CFB Using Modified Kinetic Theory • Hae Seu-Kim and Hamid Arastoopour .....	603
Particle Cross-Flow, Lateral Momentum Flux and Lateral Velocity in a Circulating Fluidized Bed • J. Zhou, J. R. Grace, C. J. Lim, C. M. H. Brereton, S. Qin and K. S. Lim .....	612

A Two-Dimensional Model for Gas Mixing in the Upper Dilute Zone of a Circulating Fluidized Bed • M. Kruse, H. Schoenfelder and J. Werther .....	620
A Simplified Model of Nitric Oxide Emission From a Circulating Fluidized Bed Combustor • J. Talukdar and P. Basu .....	635
Distinctions Between Low Density and High Density Circulating Fluidized Beds • J.-X. Zhu and H.-T. Bi .....	644
The Characteristics of Cluster in a High Density Circulating Fluidized Bed • Fei Wei, Guo-Qiang Yang, Yong Jin and Zhi-Qing Yu .....	650
Hydrodynamics of a Gas-Liquid-Solid Three Phase Circulating Fluidized Bed • W. Liang, Q. Wu, Z. Yu, Y. Jin and Z. Wang .....	656
Cocurrent Downflow Circulating Fluidized Bed (Downer) Reactors — A State of the Art Review • J.-X. Zhu, Z.-Q. Yu, Y. Jin, J. R. Grace and A. Issangya .....	662

## Articles

Comparative Reactivity of Treated FBC- and PCC-Fly Ash for SO <sub>2</sub> Removal • Ali Al-Shawabkeh, Hitoki Matsuda and Masanobu Hasatani .....	678
Preparation and Testing of Polyvinyl Alcohol Composite Membranes for Reverse Osmosis • K. Lang, T. Matsuura, G. Chowdhury and S. Sourirajan .....	686
Theoretical Analysis of Absorption of Chlorine in Aqueous Slurries of Calcium Hydroxide: Desorption of Hypochlorous Acid Gas • M.M.B. Mogal and G. D. Yadav ..	693
Propagation of a Nonionic Surfactant in Radial Sandstone Cores • W. Kwok, R. E. Hayes and H. A. Nasr-El-Din ..	705
Adsorption of Nitrogen and Carbon Monoxide on Clinoptilolite: Determination and Prediction of Pure and Binary Isotherms • Robert W. Triebe and F. Handan Tezel ..	717
On-Line Control of Supersaturation in a Continuous Cooling KCl Crystallizer • T. P. Redman, S. Rohani and G. Strathdee ..	725
A Model for Simultaneous Measurement of Gas and Solid Holdups in a Bubble Column Using Ultrasonic Method • Warsito, A. Maezawa, S. Uchida and S. Okamura ..	734
Atmospheric Spouted Bed Combustion: The Role of Hydrodynamics in Emissions Generation and Control • Ravi K. Konduri, Elmar R. Altwicker and M. H. Morgan III ..	744
Visual Study of an Airlift Pump Operating at Low Submergence Ratios • A. Tramba, A. Topalidou, E. G. Kastrinakis and S. G. Nychas, P. Francois and O. Scrivener ..	755
A Generic Algorithm For Optimization Of CFSTRs In Series With Any Biokinetic Equation • H. R. Baheri, G. A. Hill and W. J. Roesler .....	765

## Notes

A Model for Two-phase Turbulent Mixing in a Jet Bubble Column • D. Mitra-Majumdar, B. Farouk, Y. T. Shah, and K. Wisecarver .....	772
Salt Effect of CaCl <sub>2</sub> , NH <sub>4</sub> I and NaI on Vapor-Liquid Equilibrium of Ethanol + Water System at 298.15 K • Hideki Yamamoto, Tamotsu Terano, Masahiko Yanagisawa and Junji Tokunaga .....	779
Book Review .....	784
Contents Pages from Chemical Engineering Research and Design .....	754, 764

## December 1995

## Articles

Fine Particle Deposition in Laminar and Turbulent Flows • F. Vařák, B. D. Bowen, C. Y. Chen, F. Kařánek and N. Epstein .....	785
------------------------------------------------------------------------------------------------------------------------------	-----

Particle Mixing/Segregation in Gas-Solid Fluidized Bed of Ternary Mixtures • Rong-Chi Wang and Ching-Chang Chou ..	793
Analyse des interactions fluide-paroi dans un système ouvert à partir de la connaissance de la distribution des temps de séjour. Application aux dépôts d'aérosols par thermophorèse • A. Zoualal et T. Albiol .....	800
Modelling of Induced Aeration in Turbine Aerators by Use of Radial Basis Function Neural Networks • C. Aldrich and J. S. J. van Deventer .....	808
Line Tension and Wettability Effects on Reduced Gravity Nucleate Boiling Heat Transfer • K. L. Alexander and Dongqing Li .....	817
Gas-Liquid Mass Transfer in Two- and Three-Phase Upflows Through a Vertical Tube • Ken-ichi Kikuchi, Kazuhiko Ishida, Shigeyuki Enda and Hiroshi Takahashi .....	826
Permeate Pressure Build-up in Shellside-Fed Hollow Fiber Pervaporation Membranes • Xianshe Feng and Robert Y. M. Huang .....	833
A Study of Interactions Between Soil Fractions and PAH Compounds in Thermal Desorption of Contaminated Soils • Vineeta Maguire, William Y. Svrcek and Anil K. Mehrota ..	844
Estimation of Equation of State Parameters for 1,1,1,2-Tetrafluoroethane in a Modified Benedict-Webb-Rubin Equation • Maria Sörner and Krister H. U. Ström ..	854
Isobaric Vapour-Liquid Equilibrium for the Binary Mixtures of 1-Bromobutane with Isomeric Butanols at 40.0 and 101.3 kPa • Hector Artigas, Pilar Cea, Magdalena Dominguez, Felix M. Royo and José S. Urieta .....	862
Measurement of Nonlinearity in Chemical Process Control Systems: The Steady State Map • M. Guay, P. J. McLellan and D. W. Bacon .....	868
Observer Based Nonlinear Quadratic Dynamic Matrix Control for State Space and Input/Output Models • Gangadhar Gattu and Evangelos Zafiriou .....	883
Operations Optimization and Control Design for a Petroleum Distillation Process • Atsushi Mizoguchi, Thomas E. Marlin and Andrew N. Hrymak .....	896
Contrôle hydrodynamique en convection mixte de l'épaisseur de dépôts en phase gazeuse de semi-conducteurs sur des corps à symétrie de révolution • A. Ali Cherif, M. Rakotomalala, A. Daif et M. Dagueneat .....	908

## Notes

Wall Effect for the Fall of Spheres in Cylindrical Tubes at High Reynolds Number • P. H. T. Uhlherr and R. P. Chhabra .....	918
Experimental and Mathematical Studies of Natural Convection for Solid-Salt Dissolution in Water • M. S. Hameed and F. Y. Batta .....	924
Optimal Design of N Membrane Reactors in Series Using Michaelis-Menten Kinetics • D. M. F. Prazeres .....	931
Kinetic Study of Fructose-Glucose Isomerization in a Recirculation Reactor • F. Camacho-Rubio, E. Jurado-Alameda, P. González-Tello and G. Luzón-González ...	935
The Solubility of Ethane in Triethylene Glycol Monomethyl Ether • Amr Henni and Alan E. Mather .....	941
Table of Contents — 1995 .....	944
Index of Authors — 1995 .....	947
Reviewers .....	952
Keyword Index — 1995 .....	957

